

SUBSTITUTE SPECIFICATION

Claims

1. (Previously Presented) A method of inserting auxiliary digital data in a main digital data stream which main digital data stream is subsequently to be coded according to a defined coding scheme to produce a coded data stream or which main digital data stream has previously been coded according to a defined coding scheme to produce a coded data stream and decoded, the method comprising identifying at least one component of the main digital data stream which will make substantially no perceptible contribution to the subsequently coded data stream or which made substantially no perceptible contribution to the previously coded data stream and inserting data from the auxiliary data stream in the or each component to produce an output data stream carrying the auxiliary data.
2. (Original) A method according to Claim 1 wherein the main data comprises audio data to be coded according to an MPEG-type audio coding scheme and identifying at least one component comprises estimating sub-bands which are unoccupied or estimating quantisation levels, the auxiliary data being inserted in unoccupied subbands or at a level below (or at) the quantisation noise floor.
3. (Previously Presented) A method of inserting auxiliary data into an audio data stream which audio data stream is subsequently to be coded according to a defined coding scheme by analysing the audio data into a plurality of sub-bands and quantising the sub-bands or which audio data stream has previously been coded according to said defined coding scheme and decoded, the method comprising estimating sub-bands and quantisation levels for a subsequent or previous coding and inserting the auxiliary data at a level substantially below the level of estimated quantisation noise.
4. (Previously Presented) A method according to Claim 1, further comprising coding the output data stream.

SUBSTITUTE SPECIFICATION

5. (Original) A method according to Claim 4, comprising adjusting or selecting at least one parameter or decision associated with said coding in dependence on data from the auxiliary data stream.
6. (Previously Presented) A method according to Claim 4 wherein the auxiliary data is extracted prior to or during said coding.
7. (Previously Presented) A method according to Claim 1 wherein coding includes quantising data words corresponding to said main digital data stream, or a transformed version thereof, to a plurality of levels less than the number of levels codable by said data words.
8. (Previously Presented) A method according to Claim 2 wherein estimating sub-bands and quantisation levels includes transforming the audio data from the time domain to the frequency domain.
9. (Original) A method according to Claim 8 wherein the auxiliary data is inserted in the frequency domain to produce modified frequency domain data, and the modified frequency domain data is transformed back to the time domain.
10. (Previously Presented) A method according to Claim 1, including decoding a previously coded data stream to generate said main digital data stream, wherein identifying the or each component or estimating sub-bands and quantisation levels is based on information concerning the previous coding.
11. (Previously Presented) A method according to Claim 1 wherein the auxiliary data is used to establish synchronisation with or to maintain consistency with a previous coding of the main data stream.

SUBSTITUTE SPECIFICATION

12. (Previously Presented) A method according to Claim 1 wherein the auxiliary data to be carried includes a defined synchronisation sequence.

13. (Previously Presented) A method according to Claim 1 wherein the main digital data stream has at least one upper subband and wherein the auxiliary data or synchronisation signal is inserted into a said at least one upper subband.

14. (Previously Presented) A method of carrying a synchronisation sequence with a digital audio signal which digital audio signal has previously been coded according to a defined coding scheme, the method comprising inserting a defined sequence of synchronisation words into a component of the digital audio signal to facilitate identification of or synchronisation with previous coding of the signal, the component being chosen so that the sequence is substantially imperceptible.

15. (Previously Presented) A method according to Claim 14 wherein the sequence comprises at least 4 words.

16. (Previously Presented) A method of detecting a frame boundary or establishing synchronisation with a data signal produced by Claim 14 comprising searching for a sequence of synchronisation words in said component of the data signal and comparing at least one value found, or a value derived therefrom, to a stored sequence of values.

17. (Previously Presented) A method according to Claim 1, wherein the auxiliary data or the synchronisation sequence is inserted at a decoder which generates the main digital data signal/the audio data stream/the digital audio signal from a previously coded signal.

18. (Previously Presented) A digital data stream produced by a method according to Claim 1.

- 21 -
SUBSTITUTE SPECIFICATION

19. (Previously Presented) An uncoded digital data stream, preferably a linear PCM audio bitstream, comprising an audio signal and at least one of a synchronisation sequence or an auxiliary data signal embedded in an otherwise unused subband or in subbands below an MPEG quantisation noise floor of a coding process.

20. (Previously Presented) Apparatus for inserting auxiliary data into a data stream comprising:

an input module for receiving a main digital data stream which main digital data stream is subsequently to be coded according to a defined coding scheme to produce a coded data stream or which main digital data stream has previously been coded according to a defined coding scheme to produce a coded data stream and decoded;

a selection module for identifying at least one component of the main data stream which will make substantially no perceptible contribution to the subsequently coded data stream or which made substantially no perceptible contribution to the previously coded data stream; and

an insertion module for inserting auxiliary data in the or each component to produce an output data stream carrying the auxiliary data.

21. (Previously Presented) Apparatus according to Claim 20 wherein the selection module comprises an estimator for estimating sub-bands which are unoccupied or an estimator for estimating quantisation levels of an MPEG-type audio coding process.

22. (Previously Presented) Apparatus according to Claim 20 wherein one or more of said input module, selection module and insertion module are implemented at least partially in software by a processor.

23. (Previously Presented) Apparatus for inserting auxiliary data into an audio data stream which audio data stream is subsequently to be coded according to a

SUBSTITUTE SPECIFICATION

defined coding scheme by analysing the audio data into a plurality of sub-bands and quantising the sub-bands or which audio data stream has previously been coded according to said defined coding scheme and decoded, the apparatus comprising:

an estimation module for estimating sub-bands and quantisation levels for a subsequent or previous coding; and

an insertion module for inserting the auxiliary data at a level substantially below the level of estimated quantisation noise.

24. (Previously Presented) Apparatus according to Claim 22 wherein the estimating module includes a transform module for transforming the audio data from the time domain to the frequency domain.

25. (Previously Presented) Apparatus according to Claim 24 including a modification module for inserting the auxiliary data in the frequency domain to produce modified frequency domain data and a reverse transform module for transforming the modified frequency domain data back to the time domain.

26. (Previously Presented) Apparatus according to Claim 20 comprising a decoder for decoding a previously coded data stream to generate said main digital data stream or said audio data stream.

27. (Previously Presented) Apparatus according to Claim 26, wherein the estimation module is arranged to use information concerning the previous coding.

28. (Previously Presented) Apparatus according to Claim 26 arranged to insert auxiliary data for use in establishing synchronisation with or maintaining consistency with a previous coding of the main data stream.

29. (Previously Presented) Apparatus according to Claim 20 arranged to insert a defined synchronisation sequence as at least part of the auxiliary data.

SUBSTITUTE SPECIFICATION

30. (Previously Presented) Apparatus according to Claim 20 arranged to insert the auxiliary data or synchronisation signal into an upper subband of the main digital data stream.

31. (Previously Presented) Apparatus for processing a digital audio signal which digital audio signal has previously been coded according to a defined coding scheme, the apparatus comprising means for inserting a synchronisation sequence comprising a defined sequence of synchronisation words into a component of the digital audio signal to facilitate identification of or synchronisation with previous coding of the signal, wherein the component is chosen so that the inserted data will be substantially imperceptible.

32. (Previously Presented) Apparatus according to Claim 31 wherein the sequence comprises at least 4 words.

33. (Previously Presented) Apparatus according to Claim 20, further comprising a coder for coding the output data stream.

34. (Previously Presented) A coder for coding a digital data stream produced by a method according to Claim 1 arranged to extract said auxiliary data prior to or as part of coding the signal.

35. (Previously Presented) A coder according to Claim 34 including means for adjusting or selecting at least one parameter or decision associated with coding in dependence on data from the auxiliary data stream.

36. (Previously Presented) Apparatus for detecting a frame boundary or establishing synchronisation with a data signal produced by a method according to Claim 12 comprising means for searching for a sequence of synchronisation words in

SUBSTITUTE SPECIFICATION

said component of the data signal and comparing at least one value found, or a value derived therefrom, to a stored sequence of values.